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Notice of Allowability

Application No.

10/023,512

Examiner

Leonard R. Leo

Applicant(s)

SEYED-YAGOOBI ET AL.

Art Unit

3753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Amendment filed December 20, 2004.
2. ☒ The allowed claim(s) is/are 1-3, 13, 14, 24-26, 36 and 37.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|---|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input checked="" type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

EXAMINER'S AMENDMENT

An extension of time under 37 CFR 1.136(a) is required in order to make an examiner's amendment which places this application in condition for allowance. During a telephone conversation conducted on September 8, 2005, Mr. David Boutell requested an extension of time for 3 MONTH(S) and authorized the Director to charge Deposit Account No. 06-1382 the required fee of \$510.00 for this extension and authorized the following examiner's amendment. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The application has been amended as follows:

Cancel claims 4-12, 15-23, 27-35 and 38-49.

1. (Currently Amended) In a thermal energy transfer system comprising a heat transfer member having separate first and second surfaces each subjected to separate first and second temperatures, at least one of the first and second surfaces also being configured to be subjected to a fluid so that a liquid phase of the fluid is present on the at least one of said first and second surfaces, the improvement wherein:

said first surface comprising multiple and separate first surface alterations extending coextensively with an axial length of said heat transfer member and being spirally wound in plural groups, a first group being spirally wound in a first longitudinal direction along a segment of length of said heat transfer member, a mutually adjacent second group being oriented a longitudinal distance from said first group and being spirally wound in a second direction along a

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further segment of length of said heat transfer member opposite said first direction; a mutually adjacent third group being oriented a longitudinal distance from said second group and being spirally wound in said first direction along yet a further segment of length of said heat transfer member;

separate multiple electrical conductors each being received on a respective one of said separate first surface alterations;

an electric multi-phase alternating power source having multiple terminals and producing a number of phases corresponding to a number of said multiple terminals, each of said multiple electrical conductors being connected to a different one of said multiple terminals to cause, when energized by said power source, an electric traveling wave moving in a longitudinal direction of said heat transfer member to induce a pumping of the liquid phase in the longitudinal direction to thereby enhance the thermal energy transfer characteristics of said thermal energy transfer system;

whereby each group will produce an electric traveling wave moving in a direction opposite to the direction of an electric traveling wave of a mutually adjacent group so as to induce pumping of said thin liquid layer in each group at least one of away from each other and toward each other.

2. (Original) The thermal energy transfer system according to Claim 1, wherein each said first surface alteration is a recess in the heat transfer member, each said separate electrical conductor being received in a respective one of said recesses.

3. (Currently Amended) The thermal energy transfer system according to Claim 2, wherein said electrical conductors each have an outer surface oriented at least one of flush with and entirely beneath said first surface so that liquid will be able to flow in respective said first and second directions ~~direction~~ on said first surface unobstructed by said electrical conductors.

13. (Original) The thermal energy transfer system according to Claim 1, wherein each said first surface alteration is a recess in the heat transfer member, each said separate electrical conductor being received in a respective one of said recesses, wherein each said first surface alteration additionally includes a thin and flat electrically insulative layer fixedly applied to a bottom wall of each respective said recess and wherein each said electrical conductor is a thin and flat electrical conductor fixedly applied to each said insulative layer to electrically insulate each said electrical conductor from said heat transfer member.

14. (Currently Amended) The thermal energy transfer system according to Claim 13, wherein said electrical conductors each have an outer surface oriented at least one of flush with and entirely beneath said first surface so that liquid will be able to flow in a respective said first and second direction on said first surface unobstructed by said electrical conductors.

24. (Currently Amended) In a thermal energy transfer system comprising plural heat transfer members each having separate first and second surfaces each subjected to separate first and second temperatures, at least one of the first and second surfaces also being configured to be subjected to a fluid so that a liquid phase of the fluid is present on the at least one of said first and second surfaces, and an outer conduit in which is oriented the plural heat transfer members, the improvement wherein:

said first surface comprising multiple and separate first surface alterations extending coextensively with an axial length of said heat transfer member and being spirally wound in plural groups, a first group being spirally wound in a first longitudinal direction along a segment of length of said heat transfer member, a mutually adjacent second group being oriented a longitudinal distance from said first group and being spirally wound in a second direction along a further segment of length of said heat transfer member opposite said first direction; a mutually adjacent third group being oriented a longitudinal distance from said second group and being spirally wound in said first direction along yet a further segment of length of said heat transfer member;

separate multiple electrical conductors each being received on a respective one of said separate first surface alterations;

an electric multi-phase alternating power source having multiple terminals and producing a number of phases corresponding to a number of said multiple terminals, each of said multiple electrical conductors being connected to a different one of said multiple terminals to cause, when energized by said power source, an electric traveling wave moving in a longitudinal direction of said heat transfer member to induce a pumping of the liquid phase in the longitudinal direction to

thereby enhance the thermal energy transfer characteristics of said thermal energy transfer system;

whereby each group will produce an electric traveling wave moving in a direction opposite to the direction of an electric traveling wave of a mutually adjacent group so as to induce pumping of said thin liquid layer in each group at least one of away from each other and toward each other.

25. (Original) The thermal energy transfer system according to Claim 24, wherein each said first surface alteration is a recess in the heat transfer member, each said separate electrical conductor being received in a respective one of said recesses.

26. (Currently Amended) The thermal energy transfer system according to Claim 25, wherein said electrical conductors each have an outer surface oriented at least one of flush with and entirely beneath said first surface so that liquid will be able to flow in respective said first and second directions ~~direction~~ on said first surface unobstructed by said electrical conductors.

36. (Original) The thermal energy transfer system according to Claim 24, wherein each said first surface alteration is a recess in the heat transfer member, each said separate electrical conductor being received in a respective one of said recesses, wherein each said first surface alteration additionally includes a thin and flat electrically insulative layer fixedly applied to a bottom wall of each respective said recess and wherein each said electrical conductor is a thin and flat electrical conductor fixedly applied to each said insulative layer to electrically insulate each said electrical conductor from said heat transfer member.

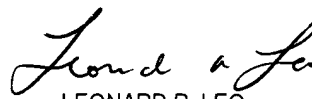
37. (Currently Amended) The thermal energy transfer system according to Claim 36, wherein said electrical conductors each have an outer surface oriented at least one of flush with and entirely beneath said first surface so that liquid will be able to flow in respective said first and second directions ~~direction~~ on said first surface unobstructed by said electrical conductors.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonard R. Leo whose telephone number is (571) 272-4916. The examiner can normally be reached on Monday thru Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gene Mancene can be reached on (571) 272-4930. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


LEONARD R. LEO
PRIMARY EXAMINER
ART UNIT 3753

September 8, 2005